

SHARVIN, G.

1ST AND 2ND ORDERS	3RD AND 4TH ORDERS
PROCESSES AND PROPERTIES INDEX	
<p><i>M</i></p> <p>*The Experimental Proof of the Non-Supraconductivity of Gray Tin Down to 1-32° K. G. Sharvin (<i>J. Physics (U.S.S.R.)</i>, 1945, 9, (4), 350-351).—[In English.] By measurement of the magnetic moment of grey tin powder in a weak magnetic field at temperatures down to 1-32° K., it is shown that, above this temperature, no <u>supraconductivity</u> occurs. In stronger fields, a small magnetic moment is observed, due to the presence of a small amount of white tin, which may be demonstrated by <u>X-ray</u> experiments. It is concluded that grey tin is not a supraconductor.—G. V. R.</p> <p><i>1</i></p>	

GANTMAKHER, V. F.; SHARVIN, Yu. V.

"Temperature dependence of the electron mean free path in tin at liquid helium temperature."

report presented at the 9th Intl Conf on Low Temperature Physics, Columbus, Ohio, 31 Aug-4 Sep 64.

Inst for Physical Problems, AS USSR

SHARVIN, Yu.V.; GANTMAKHER, V.F.

Growing metal single crystals in optically polished molds.
Prib. i tekhn. eksp. 8 no.6:165-167 N-D '63. (MIRA 17:6)

1. Institut fizicheskikh problem AN SSSR.

SHARVIN, Yu. V.

Yu. V. Sharvin, I. A. Shalnikov and K. A. Tumanov

"Superconductivity of Na in NH_3 " published in Comp Rend. Acad. Sci. URSS (56)
35-7, 1941

SHARVIN, YU. V.

M

On the Texture of Pressed Metallic Selenium. G. S. Zhulanov and Yu. V. Sharvin (Zhur. Fiz. Khim., 1945, 19, (3), 160-166).—[In Russian.] The preferred orientation of selenium crystals pressed under a pressure of 7 tons/sq.cm. at 135° C. for 1 hr., and subsequently annealed at 210° C. for 2-4 hr., was studied in a Debye camera using Co radiation and iron filters. It was found that in the case of trigonal selenium (1120) planes tend to lie in a plane perpendicular to the compression axis, irrespective of the subsequent annealing treatment. This result can be explained by assuming that the slipping planes of selenium are the same as those of tellurium, i.e., {1010} planes.—V. K.

COMMON ELEMENTS

PERIODIC TABLE

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

151 AND 151750

SHARVIN, Yu. V., Cand. Physicomath Sci.

Dissertation: "Investigation of the Depth of Magnetic Field Penetration into a Solid Superconductor." Inst. of Physical Problems, Acad Sci USSR. 21 Nov 47.

SO: Vechernyaya Moskva, Nov 1947 (Project #17836)

SHARVIN, J. V.

PA 8T62

USSR/Superconductivity
Sodium
Ammonia

Apr 1947

"On the Superconductivity of Solutions of Sodium in Ammonia," K. A. Tumanov,
A. I. Shalnikov, J. V. Sharvin, 3 pp

"CR Acad Sci" Vol LVI, No 1

Experiments to check the results reported by Ogg on superconductivity in sodium-
ammonia solutions in the range of 90 - 120° K.

8T82

SHARVIN, YU. V.

42033: TUMANOV, K. A.; SHARVIN, YU. V. - Issledovanie sil, neobkhodimyykh dlya peremesheniya granitsy mezhdru sverkhprovodyashchey i normal'noy fazami. Pis'mo v redaktsiyu. Zhurnal eksperim. I teoret. Fiziki, 1948, Byp. 11, S. 10-56.

SO: Letopis' Zhurnal'nykh Statey, Vol. 47, 1948.

EST AND JSC SYMBOLS										PROCESS AND PROPERTY INDEX										EST AND JSC SYMBOLS									
SA										<p>1408. Investigation of penetration depth of magnetic fields into massive superconductors. SHALNIKOVA, A. I. AND SHARVIN, Y. V. <i>Izv. Akad. Nauk, SSSR, Ser. Fiz.</i>, 82 (No. 3) 195-215 (1948) <i>In Russian</i>.—The temp. derivation of the penetration depth of a constant magnetic field into a spectroscopically pure Sn ellipsoid in the superconducting state is measured by the e.m.f. induced in a surrounding coil when the temp. is periodically varied 4 times per second. The temperature derivation is found to be $5.6 \times 10^{-4} \times (3.715 - T)^{-1/2}$ close to the transition temperature (3.715°K), and the penetration depth itself is deduced by integration of the experimental data. The values found are appreciably higher than those of Pippard [Abstr. 3543 (1947)] and of Laurmann and Shoenberg [Abstr. 973 (1945)]. It is suggested that this may be due to differences of surface conditions. D. S.</p>										A53 N									
ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION										EST AND JSC SYMBOLS										EST AND JSC SYMBOLS									
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SHARVIN, YU. V.

Jan 1948

USSR/Physics
Superconductivity
Magnetic fields - Analysis

"Research on the Depth of Penetration of a Magnetic Field into a Solid Superconductor,"
A. I. Shal'nikov, Yu. V. Sharvin, 1½ pp

"Zhur Eksper i Teoret Fiz" Vol XVIII, No 1

Describes experiment carried out to determine the variable EMF in a coil inside which is placed a superconduction tin model in the form of an ellipsoid 4 cm long with a diameter of 1 cm. Tabulates experimental results. Thanks P. L. Kapitza, L. D. Landau and N. V. Zavaritskiy for assistance.

PA 41T101

SHARVIN, Yu. V.

PA 51/49T73

USSR/Physics
Superconductivity
Magnetism

Nov 48

"Investigation of the Forces Necessary to Dis-
place the Boundary Between Superconducting and
Normal Phases," K. A. Tumanov, Yu. V. Sharvin,
Inst of Phys Problems, Acad Sci USSR, 1 p

"Zhur Eksp 1 Secret Fiz" Vol XVIII, No 11

Attempts to measure the moment of forces acting
on a sphere in the intermediate state while

turning it relative to the external magnetic field.

Maximum moment of force was found to be 3.4 dynes/cm
51/49T73

USSR/Physics

(Cont'd)

Nov 48

For T equal to 3.35° K (H equal to 37 Oe), 12
dynes/cm for T equal to 2.90° K (H equal to 78 Oe),
and 26 dynes/cm for T equal to 2.67° K (H equal
to 102 Oe). Submitted 13 Jul 48.

FULL TRANSLATION AVAILABLE
W-2763/49, 30 Jan 49

51/49T73

CA

Dependence of the depth of penetration of a magnetic field into a superconductor on the magnetic field strength. V. V. Sharvin (Inst. Phys. Problems Acad. Sci. U.S.S.R., Moscow). *Zhur. Eksp. Teor. Fiz.* 21, 688 (1961).—The temp. deriv. $\partial\delta/\partial T$ of the depth of penetration δ for superconducting Sn was found independent of the magnetic field H within the accuracy of the measurements. If $\partial\delta/\partial T = (\partial\delta/\partial T)_0 = \alpha [1 + \alpha(H/H_c)^2]$, where $H_c = \text{crit. } H$, α can be estd. to 0.28 ($\pm 30\%$), independent of the temp. between 3.668 and 3.4° K. . . . N. Thon

SHARVIN, Yu. V.

USSR/Physics - Superconductors

11 Aug 51

"Intermediate State of Superconductors," Ye. M. Lifshits, Yu. V. Sharvin, Inst of Phys Problems imeni Vavilov, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXIX, No. 5, pp 783-786

Considers a model of a plane-parallel plate (in a transverse magnetic field) with completely non-branching layers. Poses the problem of finding the "characteristic" value of the dimension L whose comparison will det the character of the existing structure of superconductors. Thanks Acad K. L. Landau for his interest. Submitted by Landau 13 Jun 1951.

210789

84
Set A

Electric Conduction

537,312.62
7299. Investigation of penetration depth of a magnetic field into a massive superconductor. H. Yu. V. Ruzinov. Zh. Eksp. Teor. Fiz., 22, 367-75 (No. 3, 1952) in Russian.

Using the method described in Pt I (Abstr. 1458 (1949)) the temperature dependence ΔT of penetration depth has been studied for two tin specimens whose surfaces were more perfect than that used in Pt I. The method of oscillating the temperature was also modified, this time being based on a periodic fluctuation of the thermally isolated specimen. In the neighborhood of T_c the result $\lambda = 4.6 \times 10^{-7}$ ($T_c - T$)^{0.9} was found for small fields H , while the effect of the field was found to be given by $\Delta T = (\Delta T)_0 - \alpha(1 + \alpha(H/2H_c)^2)$ with $\alpha = 0.29$.

The result for small H agrees well with data of Lawrence and Shoenberg (Abstr. 7082 (1949)), though slight discrepancies appear at lower temperatures; the higher values of λ found in Pt I are attributed to poor surface conditions. The value of α is, however, much higher than found by Figgard (Abstr. 6754 (1950)) and also than predicted by the theory of Ginsburg and Landau (Abstr. 1017 (1942)).
D. S. KOSOV

SHARVIN, Yu.V.; BALASHOVA, B.M.

Structure of superconductors in the intermediate state. Zh. eksper. teor.
Fiz. 23, No.2, 222-8 '52. (MLRA 5:9)
(PA 56 no.668:5479 '53)

SHARVIN, Yu.V.; ANDRIANOV, V.P.; SHAROVA, Ye.A.

Apparatus designed for determining small concentrations of oxygen
in gases. Zav.lab.21 no.7:853-855. '55. (MIRA 8:10)

1. Institut fizicheskikh problem imeni S.I.Vavilova Akad.nauk SSSR
(Oxygen) (Gases--Analysis)

SHARVIN, Yu.V.

Automatic regulator of gas evacuation rate. Zav.lab.21 no.10:
1261-1262 '55. (MIRA 9:1)

1. Institut fizicheskikh problem imeni S.I.Vavilova Akademii
nauk SSSR, (Gas meters)

FD-3279

SHARVIN, YU. V.
USSR/Physics - Anisotropy of Sn

Card 1/2 Pub. 146 - 38/44

Author : Sharvin, Yu. V.; Sedov, V. L.

Title : Crystalline anisotropy of the intermediate state of tin

Periodical : Zhur. eksp. i teor. fiz., 29, No 6(12), Dec 1955, 897

Abstract : The authors investigated the moments of forces acting due to a magnetic field upon a single-crystal tin sphere (99.998% pure Sn) in the intermediate state, the sphere being held in a torsion suspension so that the axis [010] was vertical and being placed at a temperature of 3.65°K into a magnetic field whose direction can be changed in the horizontal plane; in addition, a small (1-2 oersteds) vertical field varying its sign with a period of 30 seconds was imposed. He succeeded in observing force moments having apparently a reverse equilibrium character and occurring in consequence of the dependence of surface tension on the boundary of the superconducting phase and normal phase upon the orientation of this boundary relative to the lattice. He provisionally concludes that the free energy of the Sn specimen as a function of the angle between field and tetragonal axis has maxima in the directions [100] and [001], the intermediate minimum being at an angle of 25-35° to the tetragonal axis; the height of the maxima for specimen 12.6 mm in diameter and 50% superconducting

FD-3279

Card 2/2

Abstract : phase is 10^{-3} erg, in agreement with A. Pippard (Proc. Roy. Soc., 203, 195, 1950). The author thanks A. I. Shal'nikov for his interest.

Institution: Institute of Physical Problems, Academy of Sciences of the USSR

Submitted : July 18, 1955

SHARYIN, YU. V.

USSR/ Nuclear physics - Book review

Card 1/1 Pub. 86 - 36/38

Authors : Sharvin, Yu. V.

Title : Order and disorder in the world of atoms

Periodical : Priroda 44/7, 124 - 125, Jul 1955

Abstract : A review is made of the book, "Order and Disorder in the World of Atoms," by A. I. Kitaygorodskiy, published in the series of popular scientific literature by the Publishing Office of the Acad. of Sc., USSR, in 1954 and containing 72 pages. The reviewer finds the book so laden with shortcomings as to warrant only a fair rating for it.

Institution :

Submitted :

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USSR / Physics of Low Temperatures.

D-5

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9050

Author : Balashova, B.M., Sharvin, Yu.V.

Title : Structure of Intermediate State of Superconductors.

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 31, No 1, 40-44

Abstract : An investigation is made of the structure of intermediate state of tin specimens of various shapes and of a lead sphere 40 mm in diameter. The shape of the regions of the normal phase (n-regions) was determined by placing nickel powder on the surface of the superconductor; this powder was made up of particles with an average size of approximately one micron. Two-dimensional patterns were obtained for the structure of various types at various contents of the normal phase in the specimen. A study was also made of the influence of many other factors (the method of transition, the temperature, the dimensions of the specimen) on the

Card : 1/2

USSR / Physics of Low Temperatures.

D-5

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9050

Abstract : character of the resultant pattern. For various transition methods one observes the twisting of the n-regions at small values of η and the "island" form of the regions of the superconducting phase at η close to unity. On the basis of experiments on the study of the distribution of the regions in a very narrow (0.05 mm) slit between two single-crystal hemispheres, it is concluded that the winding distribution of the regions, observed on the surface at small values of η is not retained inside the specimen. On a small portion of the surface of the sphere, near its "magnetic equator", the n-regions are always of the form of comparatively broad non-winding bands in the direction of the meridian, regardless of the method of transition. An analogous pattern is observed near the equator on rings and cylinders, this being apparently due to the small angle between the surface of the specimen at these points and the magnetic field.

Card : 2/2

SHARVIN, Yu. V.

AUTHOR: Sharvin, Yu. V.

56-6-5/47

TITLE: Measuring the Surface Tension on the Boundary Between Supraconductive and Normal Phases (Izmereniye poverkhnostnogo natyazheniya na granitse mezhdu ~~svetloprovodyashchey~~ i normal'noy fazami).

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1957, Vol. 33, Nr 6, pp. 1341-1346 (USSR)

ABSTRACT: Measuring was carried out on a disk (diameter 50 mm, thickness 2 mm) which was rotatably located - generated by a coil - in a magnetic field. Behind this disk there was a small tin foil which was arranged so as to be parallel to the large disk. At first the magnetic field was directioned along the surface of the large disk, which could be read off from the maximum of the conductivity of the tin disk. The coil was then turned by the measuring angle β . The earth's gravitational field was compensated by means of a Helmholtz coil.

The structure of the intermediate state was formed on the fine nickel dust which was blown into a Dewar vessel, which contained both the large and the tin disk. The surface of the large disk was irradiated by means of a luminescence lamp.

Card 1/2

Measuring the Surface Tension on the Boundary Between
Supraconductive and Normal Phases

56-6-5/47

By means of an optical window, which was connected with a telescope, it was possible to photograph the structure. As a result for monocrystalline tin the relation

$$\Delta = 2,5 \cdot 10^{-5} \left(1 - \frac{T}{T_c}\right)^{-1/2} \text{ cm}$$

was experimentally derived within the temperature range of from 2.165° to 3.50K,

where $\Delta = \alpha \cdot (8\pi/H_c^2)$ is true.

and where measuring accuracy of Δ is 6 - 8 %. There are 7 figures and 15 references, 9 of which are Slavic.

ASSOCIATION: Institute for Physical Problems AN USSR (Institut fizicheskikh problem Akademii nauk SSSR).

SUBMITTED: August 2, 1957

AVAILABLE: Library of Congress

Card 2/2

SOV/120-59-1-43/50

AUTHOR: Sharvin, Yu. V.

TITLE: Anthracite Thermometers for Various Temperature Ranges
(Ugol'nyye termometry iz antratsita dlya razlichnykh tempera-
turnykh intervalov)

PERIODICAL: Priory i tekhnika eksperimenta, 1959, Nr 1, pp 147-148
(USSR)

ABSTRACT: The author has found that by heating anthracite in the absence of air it is easy to obtain a material whose resistance depends strongly on temperature at low temperatures and is apparently sufficiently stable. Pieces of anthracite were placed in a quartz tube and were covered by coal dust. The tube was then covered by asbestos and the whole assembly was heated in an electrical furnace in which the temperature steadily increased during five to six hours. The coal was then kept for 15 to 20 minutes at the pre-set temperature, after which the furnace was switched off. The specimens were polished and those which were found to be mechanically suitable were selected. Copper films were then deposited onto the surface of the specimens and very thin copper wires were attached to them. The copper layers were a few tens of microns thick. The final form of the thermometers was a thin

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SOV/120-59-1-43/50

Anthracite Thermometers for Various Temperature Ranges

square plate $4 \times 4 \times 0.5 \text{ mm}^3$ with electrodes on either side, or pieces $5 \times 2 \times 0.5 \text{ mm}^3$ with electrodes at the ends. The properties of these thermometers are given in the following table:

Temp. of annealing $^{\circ}\text{C}$	$\rho_{0^{\circ}\text{C}}$ ohm.cm.	$\frac{\rho_{80^{\circ}\text{K}}}{\rho_{0^{\circ}\text{C}}}$	$\rho_{4.2^{\circ}\text{K}}$, ohm.cm.
Without annealing			
500		10^2	-
900	$1 \div 0.1$	$10 \div 20$	10^{-6}
1000		$5 \div 10$ $2 \div 4$	$10^2 \div 10^3$

Card 2/3

SOV/120-59-1-43/50

Anthracite Thermometers for Various Temperature Ranges

These preliminary results show that anthracite may be a useful material for thermometers. There is 1 figure, 1 table and there are 4 references, 3 of which are English and 1 is Dutch.

ASSOCIATION: Institut fizicheskikh problem AN SSSR (Institute for Physical Problems, Academy of Sciences, USSR)

SUBMITTED: January 31, 1958.

Card 3/3

SOV/120-59-1-50/50

AUTHOR: Sharvin, Yu. V.

TITLE: Hot Gas Current Stabilizer (Stabilizator potoka goryachego gaza)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 1, p 154 (USSR)

ABSTRACT: The flame of a small gas burner can be stabilized with respect to pressure changes in the gas mains by means of a simple attachment shown in the sketch, p 154. The gas enters through the tube 1 which is blocked in the middle and passes through a U-shaped German silver tube 3, 3 x 2 mm dia. The gas flow is limited by the resistance of the flattened part of the latter tube. This part of the tube is heated by a small gas flame at the end of the tube 4 which is also flattened a few centimeters from its end in order to limit the size of the flame. The mutual disposition of the tubes should be such that when the gas pressure in the mains is at a minimum the flame should heat the tube to a temperature of only 30-40°C. The regulator can be adjusted by rotation about the horizontal axis of the tube 1. When the pressure in the mains increases, the strength of the flame also increases and the temperature of the gas in tube 2 goes up. This leads to an increase in the resistance of the narrow section of the tube since both the viscosity and the

Card 1/2

SOV/120-59-1-50/50

Hot Gas Current Stabilizer

specific volume of the gas increase with temperature. As a result, the gas current passing through the regulator may be kept constant to within 3-5% when the gas pressure in the mains changes by a factor of 2 provided the pressure change is sufficiently slow. If the pressure change is sudden, steady state is achieved in less than 3 minutes. The regulator should be screened from air currents in the room. Such a regulator was tested in continuous work for several days. There is 1 figure. This is a complete translation.

ASSOCIATION: Institut fizicheskikh problem AN SSSR (Institute for Physical Problems, Academy of Sciences, USSR)

SUBMITTED: January 31, 1958.

Card 2/2

USCOMM-DC-61,219

24(3), 24(8)

SOV/56-36-4-12/70

AUTHORS: Zernov, V. B., Sharvin, Yu. V.

TITLE: Measurement of the Resistance of Tin of High Purity at Helium Temperatures (Izmereniye soprotivleniya olova vysokoy chistoty pri geliyevykh temperaturakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1038-1045 (USSR)

ABSTRACT: Measurement of the residual resistance of metals at low temperatures is a sensitive method of determining purity. The sensitivity of the method is limited by the scattering of conduction electrons on lattice inhomogeneities which are not connected with impurity. This includes scattering on inter-crystalline boundaries (in the case of polycrystalline samples), on dislocations and other inhomogeneities of the lattice and on the outer boundaries of the crystal. If the metal investigated is an isotope-mixture, a certain "isotopic" residual resistance occurs. In the present paper the authors describe experimental investigations of a number of tin single-crystal samples of different degrees of purity and determined the temperature dependence of resistance within the range of helium temperatures

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SOV/56-36-4-12/70

Measurement of the Resistance of Tin of High Purity at Helium Temperatures

as well as anisotropy. The authors employed a contact-less method based upon measuring of the moment of forces acting upon the conductive spherical samples in a rotating magnetic field. The method was developed by A. R. Regel' (Ref 1). Figure 1 shows the experimental arrangement; measurements are discussed and theoretically explained. For a sufficiently low rotating frequency of the magnetic field it applies in first approximation for the resistance that

$Q = 10^{-9} (4\pi^2/15) (R^5 H^2 / TM) [\Omega \cdot \text{cm}]$ (R = radius of the sphere in cm, H = field strength in Oe, T = rotation period in sec, M the moment acting upon the sample in dyn.cm). With δ being the skin layer into which the field penetrates, it must hold that $\delta \gg R$ ($\delta = \sqrt{10^9 \rho T / 2\pi}$). For the purpose of experiments T was chosen at 400 - 500 sec and $R/\delta \leq 0.5$. In the following the conditions for ellipsoid-shaped samples (semiaxes $a, b=c$) are discussed. For the moment of forces it then holds that

$$M = 10^{-9} \frac{4\pi^2}{15} \frac{a^5 H^2}{T} \frac{2k^4}{Q_{11} + k^2 Q_1}$$

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where $k = b/a$. The authors use samples, in which $k = 1 + \xi$,

SOV/56-36-4-12/70

Measurement of the Resistance of Tin of High Purity at Helium Temperatures

0 ~ 2. In the following, formulas are given for $\bar{\rho} = (\rho_{\parallel} + \rho_{\perp})/2$ and for ρ_{\parallel} for the case in which

$\rho = \rho_{\max}/0.15 H^2 a^2$. Measuring results are given by table 1

and are discussed in detail. In the following the particular features of some samples are discussed, the measured and calculated $\bar{\rho}$ -values for temperatures between 4.23 and 3.73°K are compared (Table 2), and the influence exercised by working the samples upon resistance is investigated (Table 3). For the anisotropy b , $b_{\parallel}/b_{\perp} = 1.5 \div 1.6$ is found. The ratio $\rho_{\parallel}/\rho_{\perp}$ for ~4.2°K is about 1.3 - 1.5. For samples of the greatest purity the residual resistance was determined as amounting to

$\approx 3.7 \cdot 10^{-11} \Omega \cdot \text{cm}$, which corresponds to an electron mean free path of about 3 mm. Finally, the dependence of the residual resistance of tin on the impurity concentration C is investigated. In the double-logarithmic scale figure 2 shows the force of the dependence of ρ_0/ρ_{200C} on C (in percentage by

weight). The values are on a straight line. In conclusion, the

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SOV/56-36-4-12/70

Measurement of the Resistance of Tin of High Purity at Helium Temperatures

authors thank N. N. Mikhaylov, Head of the Technological Department of the IFP, for supplying the highest-purity tin; they further thank I. Ya. Pomeranchuk for letting them know the results of a paper before its publication, and they finally also thank A. I. Shal'nikov for discussions and valuable comments. There are 2 figures, 3 tables, and 17 references, 5 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute for Physical Problems of the Academy of Sciences, USSR)

SUBMITTED: October 16, 1958

Card 4/4

Y.V Sharvin

CSA 4/1

Card 3/1

23(0)
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Chattahoochee, R.

807/53-67-4-7/7

2222

the Fifth All-Union Conference on the Physics of Low Temperatures (5-ye Vsesoyuznoye sovmestchenlye po fizike nizkikh temperatur)

INDEX

REPORTER: L. A. BROWN, JR., 1953, Vol. 67, No. 4, PP. 743-750
(1953)

APPENDIX

[illegible]

SHARVIN, Yu.V.

Measuring surface tension on the boundary between the superconducting and the normal phase of indium. Zhur. eksp. i teor. fiz. 38
no.1:298-300 Jan '60. (MIRA 14:9)

1. Institut fizicheskikh problem AN SSSR.
(Surface tension) (Indium)

83582

S/056/60/038/005/015/050
B006/B070

24,7400

220/
1143

AUTHORS: Sharvin, Yu. V., Gantmakher, V. F.

TITLE: Anisotropy of Surface Tension at the Interface Between the
Superconducting and the Normal Phases of Tin

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 5, pp. 1456-1470

TEXT: The present paper is a detailed report on the determination of the anisotropy Δ of surface tension at the interface between the superconducting (s) and the normal (n) phases of tin, using two methods that give directly independent values for Δ . Δ has the dimension of a length, and is related to the free surface energy σ_{ns} by the relation

$\sigma_{ns} = \Delta H_c^2 / 8\pi$. The difficulties in the experimental determination of Δ

are discussed in the introduction. Then, the first method is described. It is based on an analysis of the structure of the intermediate state on samples with different crystalline orientations, the analysis being made with the help of ferromagnetic powder. The apparatus used is schematically

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83582

Anisotropy of Surface Tension at the Interface S/056/60/038/005/015/050
Between the Superconducting and the Normal B006/B070
Phases of Tin

shown in Fig. 1. The results of the method, called "the method of frozen flux" and described in detail, are separately discussed for the individual samples. Figs. 4-7 reproduce photographs of the structures of the intermediate stage in a field of view 1.4 cm in diameter; the white regions are superconducting, the arrows show the projection of the crystallographic axis onto the surface of the sample. The numbers of the samples and the temperatures are also given. Figs. 8-10 and 13-15 give the corresponding polar diagrams. The second method is based on the measurement of the moments of force acting on spherical samples in a magnetic field. This method is called the "method of torsion balance", and is also described in detail. Due to the anisotropy, the free energy of the sample depends on the orientation of the magnetic field relative to the crystallographic axes of the sample. The sample is suspended by an elastic thread in such a way that in the state of equilibrium the moment $M = -\partial F / \partial \alpha$ may be determined from the angle of rotation α in a horizontal magnetic field; Δ is calculated from M. Densities, impurity concentrations, and the moment m of nine samples are given in Table 1. Figs. 18-21 show the angular dependence of the moments m ($m = 8\pi M_1 / H_c^2 V$, V - sample volume) for different

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83582

Anisotropy of Surface Tension at the Interface S/056/60/038/005/015/050
Between the Superconducting and the Normal B006/B070
Phases of Tin

axes of suspension (axes of rotation). The f -values measured in the various positions (f is the free energy divided by $VH_c^2/8\pi$), $|m|_{\max}$ and Δm are given in Table 2. The results relating to the dependence of surface tension on the direction of the normal to the interface, the order of absolute magnitude of this effect, and its temperature dependence are discussed in detail. Finally, the results of the two methods are compared with each other as well as with the results of the theory. P. A. Bezuglyy, N. N. Bogolyubov, V. L. Ginzburg, and L. D. Landau are mentioned in this connection. The authors thank Academician P.L.Kapitsa for his interest, and A. I. Shal'nikov for discussions. There are 21 figures, 2 tables, and 21 references: 15 Soviet, 3 US, and 3 British.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems of the Academy of Sciences USSR)

SUBMITTED: December 31, 1959

Card 3/3

GANTMAKHER, V.F.; SHARVIN, Yu.V.

Nonmonotonous dependency of the surface impedance of tin on the magnetic field at a frequency of 1.9 mc. Zhur. eksp. i teor. fiz. 39 no.2:512-513 Ag '60. (MIRA 13:9)

1. Institut fizicheskikh problem Akademii nauk SSSR.
(Tin) (Metals at low temperatures—Electric properties)

86896

S/056/60/039/005/012/05:
B029/B077

24.2140 (1158, 1160, 1495)

AUTHORS: Sharvin, Yu. V., Gantmakher, V. F.

TITLE: The Depth of Penetration of a Magnetic Field Into a Superconductor as a Function of the Magnetic Field Strength

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 5(11), pp. 1242-1250

TEXT: So far, the intensity and characteristic of nonlinear effects in real superconductors has not been clarified by experiment and theory. The theory of V. L. Ginzburg and L. D. Landau furnishes the following expressions for a temperature range close to T_c :

$$\alpha = \frac{\lambda(\lambda + 2\sqrt{2})}{8(\lambda + \sqrt{2})^2}, \quad \lambda = \frac{\sqrt{2} / e_{\text{eff}}}{\hbar c} H_0 \int^2 (0). \text{ According to}$$

L. P. Gor'kov (Ref. 2), e_{eff} has to be twice the charge of electrons in order to agree with modern superconductor theories, and the range of application of the above relations has to be limited, too. Evidently,

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86896

The Depth of Penetration of a Magnetic Field Into S/O56/60/039/005/012/051
a Superconductor as a Function of the Magnetic B029/B077
Field Strength

no investigations have been made so far for ranges where the theories of Ginzburg and Landau do not apply. To clarify several discrepancies, the authors studied many specimens, employing the more accurate radar-frequency method. A. A. Abrikosov, L. P. Gor'kov, and I. M. Khalatnikov (Ref. 12) developed a method for a theoretical estimation at limited frequencies. On the basis of the experimental data, the authors selected an operating frequency of 2 megacycles. The following part of this paper deals with the measuring methods, the measuring instruments and their calibration, the necessary control tests, and the evaluation of the results. Superconductivity vanishes at the sharp bend of the curve $\Delta f_1(H)$; Δf_1 denotes the frequency shift of the signal of the first generator. Sometimes this superconductivity vanishes at a field strength greater than H_c . In another specimen the dependence of the effective increment $\Delta_{eff} \delta = (dr/df_1)\Delta f_1$ of $h = H_0/H_c$ was nearly parabolic. The rapid increase of α at $T \rightarrow T_c$ seems to be caused by secondary effects. The following expression was found for the transverse field:

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The Depth of Penetration of a Magnetic Field Into S/056/60/039/005/012/051
a Superconductor as a Function of the Magnetic B029/B077
Field Strength

$\Delta_{eff} = \delta(0) \left(\frac{1}{2} \alpha h_1^2 + \frac{3}{8} \beta h_1^4 \right)$; h_1 denotes the ratio of the strength of the external field to that where the specimen is no longer superconducting. Other specimens showed considerable deviations of the curves $\Delta_{eff}(h_1^2)$ from linearity at small values of $h_1^2 < 0.2$, probably due to the fact that superconductivity vanishes near the surface of the specimens. According to these experiments, α for tin is between $1.4 \cdot 10^{-2}$ and $2 \cdot 10^{-2}$ in the temperature range close to T_c ; in the same temperature range $\beta = 1 \cdot 10^{-3}$ to $2 \cdot 10^{-3}$. X

These values are only an upper limit of α . The values of α for $T \rightarrow T_c$ found in this investigation are smaller than the values calculated by Ginzburg and Landau from the penetration depth. The theoretical value of β , $4.5 \cdot 10^{-4}$, agrees with the experimental value. The values for α are two to three times greater than the one determined by M. Spiewak (Ref. 19). It would be interesting to study the surface impedance of superconductors as a function of field strength at relatively low frequencies (10^6 - 10^9 cycles). Academician P. L. Kapitsa and A. I. Shal'nikov are thanked for their

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The Depth of Penetration of a Magnetic Field Into S/056/60/039/005/012/051
a Superconductor as a Function of the Magnetic B029/B077
Field Strength

interest and for discussing the results. There are 6 figures, 1 table, and
19 references: 11 Soviet, 3 US, and 5 British. ✓

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute
of Physical Problems, Academy of Sciences USSR)

SUBMITTED: July 15, 1960

Card 4/4

SHARVIN, Yu. V. Doc Phys-Math Sci -- "Magnetic properties of superconductors"
Mos, 1961. (Min of Higher and Secondary Specialized Education UkSSR. Khar'kov
Order of Labor Red Banner State Univ im A. M. Gor'kiy). (KL, 4-61, 182)

L 47358-65 EEC(b)-2/ENI(1)/T P1-4 LJP(c) GG

ACCESSION NR: AP5008763

S/0056/65/048/003/0984/0985

AUTHOR: Sharvin, Yu. V.

TITLE: Concerning one possible method of investigating the Fermi surface

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 3, 1965, 984-985

TOPIC TAGS: Fermi surface, electron focusing, electron mean free path

ABSTRACT: The author describes an idea for an experiment which produces inside a metal single crystal a configuration operating like a beta spectrograph with focusing of the electrons in a longitudinal magnetic field. The principle of the configuration is based on the fact that if there is an elliptic turning point on the Fermi surface for a given direction of the uniform magnetic field, then electrons located in the vicinity of this point of momentum space will be focused by the magnetic field in such a way that electrons emerging from some point inside the metal will collect again at a point lying on the same line of force at a distance L from the first point. The distance L is uniquely connected with the field strength. In order to observe the focusing effect it is proposed to measure the resistance of the sample between two contacts of very small size. Two possible

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L 47358-65

ACCESSION NR: AP5008763

physical arrangements are proposed. An estimate shows that for $L = 0.05$ cm, a contact diameter 10^{-4} cm, and a measuring current 10mA the amplitude of the voltage can reach 10^{-7} V, which is fully measurable. One of the basic difficulties of the method is exact adjustment of the magnetic field direction. The effect described can yield information on the curvature of the Fermi surface and on the electron mean free path and its temperature dependence. "I thank A. A. Abrikosov for useful discussions and P. L. Kapitsa for interest in the work." Orig. art. has: 2 formulas.

ASSOCIATION: Institut fizicheskikh problem AN SSSR (Institute of Physics Problems AN SSSR)

SUBMITTED: 30Dec64

ENCL: 00

SUB CODE: *MP*

NR REF SOV: 000

OTHER: 000

Card *2/2* *CC*

L 52954-65 EWT(d)/EWT(l)/EWT(m)/ENP(w)/EPF(c)/EEC(k)-2/EPF(n)-2/ENA(d)/EPR
T/ENP(t)/ENG(c)/ENP(b)/ETC(m) Pr-4/Pu-4 IJP(c) JD/WW

ACCESSION NR: AP5010501

UR/0056/65/048/004/1077/1080

AUTHOR: Gantmakher, V. F.; Sharvin, Yu. V.

TITLE: Temperature dependence of the mean free path of electrons in tin at low temperatures

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 4, 1965, 1077-1080

TOPIC TAGS: tin, electron mean free path, Fermi surface, size effect, electron phonon scattering, low temperature research

ABSTRACT: The temperature dependence of the amplitude of the size effect was measured at the limiting points in tin for the purpose of obtaining detailed data on the mean free path of the electrons at low temperatures. The procedure used is that proposed by one of the authors earlier (Gantmakher, with E. A. Kaner, ZhETF v. 45, 1430, 1963) and based on the measurement of the relative line intensity in the size effect, as described in another paper (Gantmakher, ZhETF v. 44, 811, 1963). The measured size-effect was found to increase like the 3.3 power of the temperature, which is close to the cubic dependence expected from the Bloch theory. The effective mean free path between two elementary acts of interaction with phonons

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L 52954-65

ACCESSION NR: AP5010501

4

was determined from the experimental data for electrons located near the investigated point on the Fermi surface, and found to be of the order of several centimeters at 2K. The results show that in addition to the lines whose intensity changes by one order of magnitude in the investigated range of temperatures, there is also a line whose amplitude is temperature-independent within the limits of experimental error. This line corresponds to the extremal trajectory enveloping the cylinder in the fourth zone of the Fermi surface of the tin sample in the (100) plane. This absence of temperature dependence is attributed to the cylindrical shape of the investigated part of the Fermi surface, but no qualitative explanation is found for this connection. "The authors thank P. L. Kapitza for interest in the work, and M. Ya. Azbel' and A. I. Shal'nikov for a discussion of the results." Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki tverdogo tela Akademii nauk SSSR (Institute of Solid State Physics, Academy of Sciences SSSR)

SUBMITTED: 25Nov64

ENCL: 00

SUB CODE: 98

NR REF SOV: 006

OTHER: 001

Card 2/2

L 2352-66 EWT(1)/EWT(m)/EPA(w)-2/T/EWP(t)/EWP(b)/EWA(m)-2/EWA(c) IJP(c) JD/AT

ACCESSION NR: AP5016286

UR/0386/65/001/005/0054/0057

AUTHOR: Sharvin, Yu. V.; Fisher, L. M.

TITLE: Observation of focused electron beams in a metal

SOURCE: Zhurnal eksperimental'noy i tekhnicheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 1, no. 5, 1965, 54-57

TOPIC TAGS: electron beam, electron motion, electron spectrum

ABSTRACT: The authors have performed the experiment proposed by one of them earlier (Sharvin, ZhETF v. 48, 984, 1965), aimed at producing and observing in a metal with large mean free path electron beams starting from a definite point of the sample and focused by longitudinal magnetic field in another point of the sample. A diagram of the experiment is shown in Fig. 1 of the Enclosure. The experiment was carried out at 2K with two thin points of tin wire (60 μ in diameter) were soldered to a single crystal plate of high purity. The current was 200 ma. The sample was placed in a magnetic field which could be varied in magnitude and direction. In the absence of a magnetic field, the measured voltage was quite small because of the large conductivity of the sample. When the magnetic field was turned on, a signal appeared in the circuit, and its magnitude increased when the field became

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L 2352-66

ACCESSION NR: AP5016286

perpendicular to the sample. The signal increased approximately in proportion to the square of the magnetic field, but in addition exhibited periodically repeated maxima, which could be attributed to the focusing of definite groups of electrons, accelerated by the electric field. The magnitude of the effect is in satisfactory agreement with the estimates made in earlier papers. Upon focusing, the electrons execute an integral number of revolutions, (moving along helical paths) as they move beneath the ends of the metal. The relation between the observed peaks and the Fermi surface of the metal is briefly discussed. "We thank P. L. Kapitza for interest in the work." Orig. art. has: 2 figures.

ASSOCIATION: Institut fizicheskikh problem im. S. I. Vavilova Akademii nauk SSSR
(Institute of Physics Problems, Academy of Sciences, SSSR)

SUBMITTED: 29Apr65

ENCL: 01

44 55
SUB CODE: NP, MM

NO REF SOV: 001

OTHER: 000

Card 2/3

L 2352-66

ACCESSION NR: AP5016286

ENCLOSURE: 01

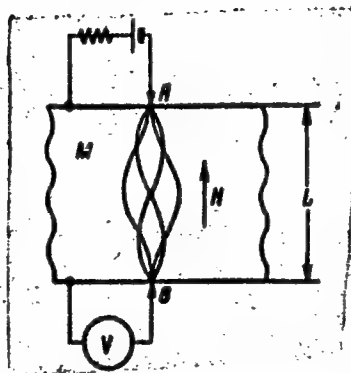


Fig. 1. Diagram of experiment

Card 3/3

L 9297-66 EWT(1)/EWT(m)/I/EMP(t)/EMP(b)/EWA(c) IJP(c) JU/66

ACC NR: AP5026411

SOURCE CODE: UR/0386/65/002/006/0287/0291

AUTHOR: Sharvin, Yu. V.

ORG: Institute of Physics Problems, Academy of Sciences SSSR (Institut fizicheskikh problem Akademii nauk SSSR)

TITLE: Observation of dynamic intermediate state of superconductors with the aid of microcontacts

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 6, 1965, 287-291

TOPIC TAGS: superconductivity, tin, phase transition

ABSTRACT: The author reports results of experiments showing that the model proposed by C. J. Gorter (Physica v. 23, 45, 1957) for the intermediate state of a superconductor in which current flows from an external source, according to which alternating layers of superconducting and normal phases should arrange themselves in the sample in the direction of the current and move continuously in the perpendicular direction, is realized in some cases. In particular, the author observed continuous motion of superconducting and normal layers under stationary external conditions. A single-crystal disc of thickness $L = 0.4$ mm and of 18 mm diameter, made of tin containing about $10^{-4}\%$ impurities, was placed at $T < T_c$ in a magnetic field H oriented at an angle β to the surface of the disc, and went over into the intermediate state. The direct current I , whose magnetic field at the sample was much smaller than H , was made to flow through the sample in the direction of the projection of H on the sample

Card 1/3

L 9297-66

ACC NR: AP5026411

surface (Fig. 1). The structure of the intermediate state, produced in the plate under the influence of the inclined field, had in the case of sufficiently small β the form of layers elongated along the projection of the field on the surface of the plate. The motion of the layers was observed with the aid of a wire A welded to the sample and carrying a measuring current $i = 3$ ma. The voltage V was measured with the aid of a galvanometric amplifier and an automatic recorder. The resistance $R = V/i$ depended on the state of the material of the sample near the contact with the wire, increasing by $\sim 10^{-3}$ ohm when superconductivity was destroyed. The resistance varied periodically with the time; the maximum value of R corresponded to the normal state of the sample near the contact, and the minimum to the superconducting state. With increasing I the oscillations became more frequent, but the relative widths of the maxima and the minima remained unchanged. The oscillations stopped when I dropped to several tenths of an ampere. These observations prove the existence of continuous motion of the layers in the sample in the direction of the y axis. The velocity of the layers was calculated from the spatial period of the structure. Comparing the obtained results with earlier investigations (ZhETF v. 48, 984, 1965) the author concludes that the motion of the layers arises only when some additional factors prevent the layers from becoming oriented perpendicular to

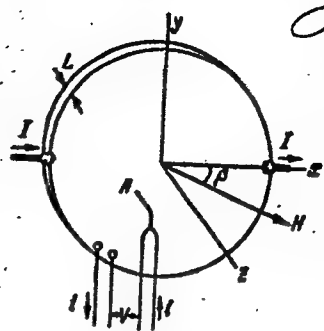


Fig. 1. Diagram of experimental setup.

Card 2/3

L 9297-66

ACC NR: AP5026411

the current direction. The nature of these factors is discussed briefly. Orig. art.
has: 2 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 27Jul65/ ORIG REF: 005/ OTH REF: 003

60
Card 3/3

KHARITON, Yu.B.; KONDRAT'YEV, V.N.; BOROVIK-FOMANOV, A.S.; ZAVARITSKIY,
N.V.; MALKOV, M.P.; KHAYKIN, M.S.; SHARVIN, Yu.V.

Aleksandr Iosifovich Shal'nikov; on his 60th birthday. Usp.
fiz. nauk 87 no.1:171-172 S '65. (MIRA 18:9)

SHARVIN, Yu.V.; FISHER, L.M.

Observation of focused electron beams in a metal. Pis'. v
red. Zhur. eksper. i teor. fiz. 1 no.5:54-57 Je '65.

(MIRA 18:11)

1. Institut fizicheskikh problem imeni Vavilova AN SSSR.
Submitted April 29, 1965.

ACC NR: AP7000521 SOURCE CODE: UR/0048/66/030/011/1768/1770

AUTHOR: Volodichev, N. N.; Nesterov, V. Ye.; Savenko, I. A.; Sharvina, K. N.

ORG: none

TITLE: Study of the proton component of the inner radiation belt in the Brazilian anomaly by artificial Earth satellites Proton-1 and Proton-2 /Paper presented at the All-Union Conference on Physics of Cosmic Rays held in Moscow from 15 to 20 November 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 11, 1966, 1768-1770

TOPIC TAGS: proton counter, magnetic anomaly, *proton, radiation belt, meteoro-*
logic satellite, Cherenkov counter, scintillation counter

ABSTRACT: The distribution of geomagnetically trapped protons with $E_p > 100$ Mev above the Brazilian anomaly was studied by the Proton-1 and Proton-2 satellites which repeatedly passed over that region at an altitude of 500 km. Since electrons with energies greater than 20 Mev are practically nonexistent in the inner radiation belt above the Brazilian anomaly it could be assumed that only high-energy protons were registered by the SEZ-1 apparatus, which consisted of a Cherenkov counter placed between two scintillation counters which could detect protons with $E_p > 100$ Mev and electrons with $E_e > 20$ Mev. A similar

Card 1/3

ACC NR: AP7000521

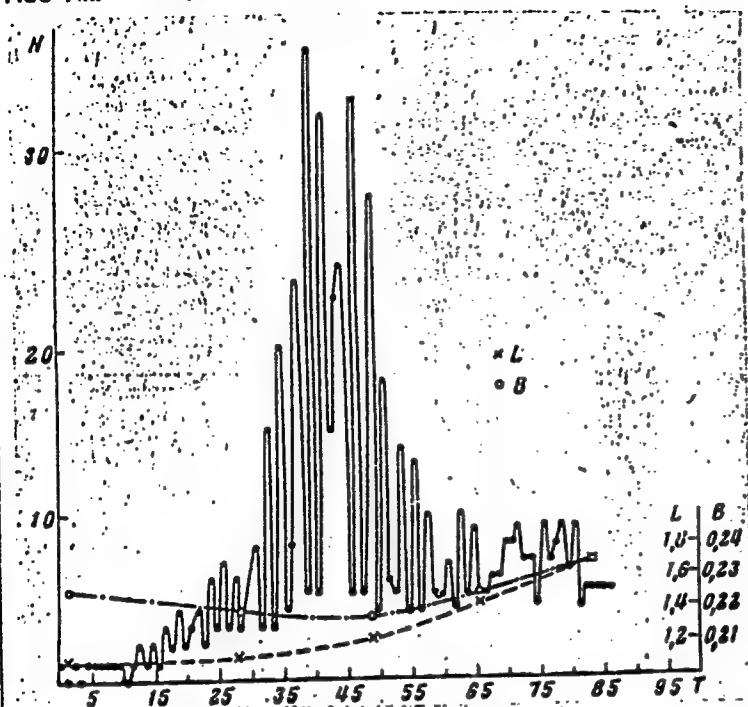


Fig. 1. Triple coincidence count rate ($E_p > 400$ Mev) as a function of time and coordinates L and B during one pass by the Proton-1 satellite

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ACC NR: AP7000521

equipment arrangement was used to detect the flux comprised of protons with $E_p > 400$ Mev. The geometric factor of the equipment was $133 \text{ cm}^2 \cdot \text{sterad}$. Information from the counters was partially processed on-board and the results were sent to Earth once every 9 seconds. Preliminary data analysis shows that the proton concentration intensity varied with a period of a few tens of seconds which may have been caused by the satellite's spin about its own axis changing the pitch-angle between the measuring apparatus and the anomaly. Proton intensity however may be obtained from the envelope of a curve giving the count rate variation such as in Fig. 1. While the Proton-1 satellite could not register protons with $E_p > 100$ Mev, the Proton-2 could register both those with $E_p > 100$ Mev and those with $E_p > 400$ Mev protons. Judging from the average of three orbits, the ratio of concentrations of protons with $E_p > 100$ Mev and protons with $E_p > 400$ Mev varies from 18 ± 0.5 to 8.5 ± 0.2 . The total measurement time for these results was 4 minutes. It is proposed that in the future the proton spectrum be measured as a function of coordinates B and L. Orig. art. has:
2 figures.

[WA-75]
[BD]

SUB CODE: 04/8,20/SUBM DATE: none/ ORIG REF: 002/ OTH REF: 001

Card 3/3

L 3226-66 -- EMT(1)/EMT(m)/FCC/EMA(h) -- DIAAP -- OS/GW -- UR/0000/65/000/000/0448/0454
 ACCESSION NR: AT5023617

AUTHORS: Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Tel'tsov, M. Y.;
Shavrin, P. I.; Sharyina, K. N. 50
241

TITLE: Investigation of the inner Van Allen belt and the artificial radiation belt of the earth at low altitudes during 1960-1964

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 448-454

TOPIC TAGS: radiation belt, Van Allen belt, magnetic anomaly, atmosphere

ABSTRACT: Investigations carried out during 1960-1964 of the inner Van Allen and artificial radiation belts of the earth at low altitudes are discussed with emphasis on the South Atlantic magnetic anomaly off the coast of Brazil. Most of the measurements of particle fluxes were made on five satellites of the "Kosmos" series and the second and third cosmic ships. It was found that in the magnetic shells $1.2 \leq L \leq 1.4$ the intensity of particles toward the east from the anomaly was greater than that toward the west from the anomaly, and for

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L 3226-66
ACCESSION NR: AT5023617

1.5 \leq L \leq 2.1 the reverse was true. Thus, the main component of the flux of particles in the first case was protons and in the second case—electrons. It is also concluded from measurements of the change in electron intensity with altitude that the magnitude of the standard atmosphere is significantly greater than that obtained by D. O. King-Hele and M. Janice (Proc. Roy. Soc., A270, N 1343, 562, 1962). The lifetime of electrons in the artificial radiation belt created by a high-altitude thermonuclear explosion on July 9, 1962 was found to range from 170 days for L=1.3 down to about 70 days for larger L up to 2.0. Orig. art. has: 9 figures; and 1 table. [04]

ASSOCIATION: *kosmicheskaya karte* (All-Union conference on cosmic rays)

SUBMITTED: 02Sep65

ENCL: 00

SUB CODE: ES, SV

NO REF SOV: 007

OTHER: 007

ATD PRESS: 4106

Card 2/2

SHARVINA, K. N.; VERNOV, S. N.; NESTEROV, V. Ye.; PISARENKO, N. F.; SAVENKO, I. A.;
SAVUN, O. I.; SHAVRIN, P. I.; SHARVINA, K. N.;

" A Study of the Earth's radiation belts in the region of the Brazilian magnetic anomaly
at altitudes of 235 to 345 kms. (USSR). "

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence
Italy, 8-20 May 1964.

ACCESSION NR: AP4041571

S/0293/64/002/003/0485/0491

AUTHOR: Vernov, S. N.; Nesterov, V. Ye.; Savenko, I. A.; Shavrin, P. I.; Sharvina, K. N.

TITLE: Geographical intensity distribution of radiation in the region of Brazilian magnetic anomaly at the height of 300 km

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 485-491

TOPIC TAGS: artificial satellite, geomagnetic anomaly, Geiger counter, oscillation counter, isoline, nuclear burst, artificial radiation belt, radiation intensity, inner belt

ABSTRACT: Data from Cosmos 4, Cosmos 7, and Cosmos 15, which passed through the region of the Brazilian geomagnetic anomaly at the heights of 235—340 Km, have been studied. Charged particles were counted by Geiger and oscillation counters. The results of processing are represented graphically by isolines, and the numerical values are given in a table. The numbers of the table show a difference between the two measurements. The data from Cosmos 4 were obtained before a nuclear burst in the atmosphere, and the data of Cosmos 15 were obtained

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ACCESSION NR: AP4041571

after the burst. The difference is created by an artificial radiation belt caused by the burst. The radiation of the artificial belt consists of electrons with energies of about 1—7 Mev, which have been recorded in the region of the Brazilian anomaly. The radiation intensity in the inner belt and in the artificial belt is approximately equal. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: none

SUBMITTED: 14Jan64

ATD PRESS: 3056

ENCL: 00

SUB CODE: AA

NO REF SOV: 004

OTHER: 002

Card 2/2

L-20227-65 EMT(1)/EWG(v)/FCC/EEC-4/EEC(t)/EMA(h) Po-4/Pe-5/Pq-4/Pao-2/Peb/P1-4/
 Pb-4 AEDC(a)/SSD(c)/SSD/AFHL/ASD(a)-3/AS(mp)-2/ASD(p)-3/AFMD(c)/AFETR/ESD(gs)/
 ESD(s1)/ESD(t) GT/TS
 V. ACCESSION NR: AP5002105 8/0048/64/028/012/2049/2057

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shavrin, P. I.;
 Nestorov, V. Ye.; Pisarenko, M. P.; Sharvina, K. M.

TITLE: Data on the earth's radiation belts obtained during the Cosmos flights at altitudes of 200-400 km. [Report presented at the Vsesoyuzhnoye soveshchaniye po fizike kosmicheskikh luchey (All-Union Conference on Cosmic Ray Physics), held at Moscow, 4-10 October 1963]

SOURCE: AM SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 12, 1964, 2049-2057.

TOPIC TAGS: satellite, radiation density, electron density, solar activity, radiation belt, cosmic ray

ABSTRACT: Some data on the earth's radiation belts collected during the Cosmos series in 1960-1963 at altitudes below 400 km are presented. Data obtained from Cosmos-4 indicate a maximum density shift within the outer radiation belt over a broad interval of longitude during magnetically quiet days. At the same time, an increase of average density was also noted within the radiation belts. From data of

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L 20227-65
ACCESSION NR: AP5002105

2
Cosmos-7 and Cosmos-15 the geographical distribution of electron density in the Brazilian anomaly at an altitude of approx 300 km was determined. This distribution roughly coincided with electron distribution in the inner-radiation belt measured by Discoverer-31. The existence of electrons with energies exceeding 2 Mev within the inner radiation belt are indirectly indicated. During the flight of Cosmos-1 in April 1962, the counting rate of the Geiger counter showed a four-fold increase over satellite measurements made in August 1960. The rate of increase coincided with the proton-density change within the inner belt during the period of the transition to minimum solar activity (and decreased atmospheric density). Orig. art. has: 6 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: AA, ES

NO REF SOV: 007

OTHER: 010

ATD PRESS: 3162

Card 2/2

VERNOV, S.N.; NESTEROV, V.Ye.; PISARENKO, N.F.; SAVENKO, I.A.;
SAVUN, O.I.; SHAVRIN, P.I.; SHARVINA, I.N.

Study of the earth's radiation belts in the region of the
Brazilian magnetic anomaly at altitudes between 235 and 345 km.
Kosm. issl. 2 no.3:492-497 My-Je '64. (MIRA 17:7)

SHARY, G.

Shary, G. -- "Investigation of the Process of Scooping Shale Rocks by Bucket Rock-Loading Machines." Min Higher Education USSR, Moscow Mining Inst imeni I. V. Stalin, Moscow, 1955 (Dissertation for the Degree of Candidate in Technical Sciences)

SO: Knizhnaya Letopis', No. 23, Moscow, Jun 55, pp 87-104

PODCHENOV, I.I.; LITVINOV, G.P.; KANUNOV, V.I.; SHAY, L..

Study of the antigenic structure of human cells in cultures of strains "immunologically purified" of the serum component of the medium. Folia biol. (praha) 10 no.6:465-471 '64.

1. Institute of Experimental Biology, Academy of Medical Sciences of the U.S.S.R., Moscow.

TEBYAKINA, A.Ye.; SHARYAYEVA, V.L.; SVINTSOVA, Ye.M.

Stability of the biologic activity and pharmacologic characteristics of streptomycin (calcium chloride complex) [with summary in French, p.64] Antibiotiki 1 no.4:41-43 J1-Ag '56. (MLRA 9:11)

1. Gosudarstvennyy kontrol'nyy institut syvorotok i vaktsin imeni L.A.Tarasevicha.

(STREPTOMYCIN, eff.

calcium chloride complex, on preserv, of biol. stability over longer periods)

SOV/123-59-15-59642

Translation from: Referativnyy zhurnal. Mashinostroyeniye, 1959, Nr 15, p 107 (USSR)

AUTHOR: Sharygin, A.A.

TITLE: Multipurpose Pneumatic Jig

PERIODICAL: Byul. tekhn.-ekon. inform. Sovnarkhoz Rostovsk. ekon. adm. r-na, 1958,
Nr 8, p 22

ABSTRACT: The article has not been reviewed.

Card 1/1

SHAPIRO, A.A.

SHAPIRO, A.A.

"Disturbances and Restoration of the Functions of the Stomach During Experimental Pathology of the Lungs and Pleura." Cand Biol Sci, Odessa Agricultural Inst, Min Higher Education USSR, Ivanovo, 1955. (KL, No 17, Apr 55)

SC: Sum.No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (16).

Nervous System.

Abs Jour : Ref Zhur - Biologiya, No 13, 1958, No. 60821

Author : Sharygin, A. A.; Poltyrev, S. S.

Inst : Ivanovo Agricultural Institute

Title : Some Vegetative Disorders in Experimental Pathology
of the Lungs and the Pleura

Orig Pub : Sb. nauchn. tr. Ivanovsk. s.-kh. in-ta, 1956, Vyp. 13,
108-115

Abstract : No abstract given

Card 1/1

153

SHARYGIN, A.

USSR/Human and Animal Physiology - Digestion.

V-7

Abs Jour : Ref Zhur - Biol., No 1, 1958, 4074

Author : A. Sharygin, S. Poltyryev

Inst : Ivanovsk Agricultural Institute.

Title : The Mechanism of the Development of Abnormalities in the Gastric Functions and That of Their Restoration in Experimental Pulmonary and Pleural Pathology.

Orig Pub : Sb. nauch. tr. Ivanovsk. s.-kh. in-ta, 1956, issue 13, 188-190

Abstract : When an AgNO_3 solution was injected intrapleurally after a preliminary novocaine blockade of the pleural interoreceptors, or after a neck vagosympathetic blockade (Vishnyevskiy's method), a relatively weak inflammatory process was observed. Abnormalities of the secretory-excretory gastric activity and of the nitrogen metabolism in

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USSR/Human and Animal Physiology - Digestion.

V-7

Abs Jour : Ref Zhur - Biol., No 1, 1958, 4074

dogs with fistulas were also weakly expressed.
Experimental neurosis (Kryazhev's) was accompanied by significant changes in the nitrogen metabolism and in the gastric activity.
Experimental pleuropneumonia produced on a background of a "VND" [?] breakdown was more severe than in healthy dogs and was accompanied by sharper and longer-lasting abnormalities of the gastric secretory-excretory activity and of the nitrogen metabolism. Under such conditions, combined therapy hastened the restoration of the functions.

Card 2/2

SHARYGIN, A.I.; KATSEPOVA, V.I.

Experience in combining the duties of spinner and doffer. Tekst.
prom. 21 no.3:53-54 Mr '61. (MIRA 14:3)

1. Direktor Voronezhskoy kordnoy fabriki (for Sharygin). 2. Starshiy
normirovshchik Voronezhskoy kordnoy fabriki (for Katsepova).
(Spinning)

SHARYGIN, A.I.

Fritting of the steel tapping hole. Metallurg 7 no.7:24 J1 '62.
(MIRA 15:7)

1. Ural'skiy vagonostroitel'nyy zavod.
(Smelting furnaces--Maintenance and repair)

SHARYGIN, A.I.; PEYSAKH, I.I.; ISKAKOV, S.I.; MITROFANOV, V.N.; SHASTINA, Z.Ya.;
SHCHERBAKOV, I.M.; GOMBERG, I.B.

Information. Tekst. prom. 24 no.9:91-97 S '64.

(MIRA 17:11)

1. Direktor Voronezhskoy kordnoy fabriki (for Sharygin).
2. Nachal'-nik proizvodstvenno-tekhnicheskogo otdela upravleniya legkoy promyshlennosti Soveta narodnogo khozyaystva Moldavskoy SSR (for Peysakh).
3. Nachal'nik konstruktorskogo otdela Spetsial'nogo konstruktorskogo byuro Yuzhno-Kazakhstanskogo Soveta narodnogo khozyaystva (for Isakov).
4. Nachal'nik konstruktorskogo sektora Spetsial'nogo konstruktorskogo byuro Yuzhno-Kazakhstanskogo soveta narodnogo khozyaystva (for Mitrofanov).
5. Nachal'nik Byuro tekhnicheskoy informatsii Melekesskogo l'no kombinata (for Shastina).
6. Glavnyy inzh. Khersonskogo khlopchatobumazhnogo kombinata (for Shcherbakov).
7. Nachal'nik tekhnicheskogo otdela Khersonskogo khlopchatobumazhnogo kombinata (for Gomborg).

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S/020/60/132/01/17/064

AUTHOR: Sharygin, I.F.

TITLE: The Use of Number-theoretical Methods of Integration in the Case of Non-periodical Functions \0

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No.1, pp. 71-74

TEXT: To the class $H_s(\alpha, c)$ there belong functions for which

$$\left| \frac{\partial^n f(x_1, \dots, x_s)}{\partial x_1^{\gamma_1} \dots \partial x_s^{\gamma_s}} \right| < c, \quad 0 \leq n \leq \alpha s, \quad 0 \leq \gamma_i \leq \alpha, \quad \gamma_1 + \dots + \gamma_s = n.$$

Theorem 1: Let $f(x_1, \dots, x_s) \in H_s(\alpha, c)$; $\alpha > 1$; let the function $\tau_\alpha(z)$ have the properties

- 1) $0 = \tau_\alpha(0) < \tau_\alpha(z') < \tau_\alpha(z'') < \tau_\alpha(1) = 1$; $0 < z' < z'' < 1$
- 2) $|\tau_\alpha^{(k)}(z)| < A$, $0 \leq k \leq \alpha + 1$
- 3) $\tau_\alpha^{(k)}(0) = \tau_\alpha^{(k)}(1) = 0$, $1 \leq k \leq \alpha$.

Then there exist integers a_1, \dots, a_s , $a_i = a_i(N)$ so that
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S/020/60/132/01/17/064

The Use of Number-theoretical Methods of
Integration in the Case of Non-periodical Functions

$$R = \left| \frac{1}{N} \sum_{k=1}^N f \left[\tau_{\alpha} \left(\left\{ \frac{ka_1}{N} \right\} \right), \dots, \tau_{\alpha} \left(\left\{ \frac{ka_s}{N} \right\} \right) \right] \tau'_{\alpha} \left(\left\{ \frac{ka_1}{N} \right\} \right) \dots \tau'_{\alpha} \left(\left\{ \frac{ka_s}{N} \right\} \right) - \int_0^1 \dots \int_0^1 f(x_1, \dots, x_s) dx_1 \dots dx_s \right| = O \left(\frac{\ln^{\alpha_s} N}{N} \right),$$

where $\{x\}$ denotes the fractional part of x .
Let

$$R^N(z, f) = \left| \frac{1}{N} \sum_{k=1}^N f \left(\frac{k}{N}, \frac{kz}{N}, \dots, \frac{kz^{s-1}}{N} \right) - \int_0^1 \dots \int_0^1 f(x_1, \dots, x_s) dx_1 \dots dx_s \right|.$$

Theorem 2: If $N = p > s$ is a prime number, then there exists an $a = a(p)$, $1 \leq a \leq p-1$, so that

$$R^N(a, f) = O \left(\frac{\ln^s N}{N} \right),$$

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The Use of Number-theoretical Methods of S/020/60/132/01/17/064
Integration in the Case of Non-periodical Functions

where $f(x_1, \dots, x_s) \in H_s(1, c)$ on a certain parallelepiped the edges of which are parallel to the coordinate axes, and in the remaining space it is defined by $f(x_1, \dots, x_s) = f(\{\alpha_1\}, \dots, \{x_s\})$.

A third theorem relates to the approximate solution of integral equations. For the proof the author uses papers of Korobov (Ref. 2,3,4) and Bokhvalov (Ref.1). He mentions Yu.N. Shakhov (Ref. 5). There are 5 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova
(Moscow State University imeni M.V. Lomonosov)

PRESENTED: December 3, 1959, by S.L. Sobolev, Academician

SUBMITTED: November 20, 1959

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L 12739-63

BDS/EWT(d)/FCC(w) AFFTC IJP(C)

S/208/63/003/002/010/014

51

AUTHOR: Sharygin, I. F. (Moscow)

TITLE: Estimates from below of errors of the quadrature formulas of certain class of functions

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 3, no. 2, 1963, 370-376

TEXT: The author estimates the upper boundary of errors of the corresponding formula for all functions of the given class. The function $f(x_1, \dots, x_s)$ is

$$\sum_{m_1, \dots, m_s = -\infty}^{\infty} c(m_1, \dots, m_s) e^{2\pi i(m_1 x_1 + \dots + m_s x_s)} \quad (0.1)$$

and the author considers only three classes of functions given by

$$f(x_1, \dots, x_s) \in A_s(h), \text{ if } c(m_1, \dots, m_s) \leq e^{-h(|m_1| + \dots + |m_s|)}, \quad (0.2)$$

$$f(x_1, \dots, x_s) \in E_s(\alpha), \text{ if } |c(m_1, \dots, m_s)| \leq (\bar{m}_1 \dots \bar{m}_s)^{-\alpha}, \bar{m} = \max(1, |m|)$$

Card 1/2

SHASHAYEV, M.A.

Biological characteristics of plague bacteriophages, Zhur. mikro-
biol., epid. i immun. 41 no.12:32-35 D '64.

(MIRA 18:3)
1. Sredneaziatskiy nauchno-issledovatel'skiy protivochumnyy insti-
tut, Alma-Ata.

BIBIKOVA, V.A.; SHASHAYEV, M.A.; RESHETNIKOVA, P.I.; SHAPIRA, I.L.

Method of laboratory feeding of fleas in studying their role
in the preservation and transmission of the pathogens of
infectious diseases. Med. paraz. i paraz. bol. 33 no.6:739-
740 N-D '64. (MIRA 18:6)

1. Sredneaziatskiy nauchno-issledovatel'skiy protivochumnyy
institut, Alma-Ata.

MARTINEVSKIY, I.L.; SHASHAYEV, M.A.; TARAKANOV, N.F.; SHAPOVALOV, A.T.

Fate of plague bacteriophage in the organism of healthy and plague-infected greater gerbils and the possible passage of its transmission under experimental conditions. Zhur. mikrobiol. epid. i immun. 40 no.5:31-34 My '64.

(MIRA 17:6)

1. Iz Sredneaziatskogo nauchno-issledovatel'skogo protivochumnogo instituta Ministerstva zdravcokhraneniya SSSR.

L 40750-65 EWT(1)/EWA(j)/EWA(b)-2 JK
ACCESSION NR: AP5012391

UR/0016/64/000/012/0032/0035

AUTHOR: Shashayev, M. A.

TITLE: Biological characteristics of plague bacteriophages

SOURCE: Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 12, 1964, 32-35

TOPIC TAGS: bacterial disease, bacteriology, bacteria

ABSTRACT: Reports on the results of a study of the morphology of negative colonies, serological properties, sorption, latent period, yield, and sensitivity to x-rays of 19 plague bacteriophages isolated from various objects. Twenty-two hours after incubation at 28° C on *Past. pestis* strain No. 257, all the bacteriophages formed negative disk colonies with a transparent center and zone of incomplete lysis. The negative colonies were 10-11 mm in diameter.

The constant values of the rate of bacteriophage neutralization by homologous and heterologous antiphage sera ranged from 1 to 34.6 min⁻¹. Within 5 minutes the bacteriophages were absorbed on the *Past. pestis* strain No. 257 at 28° C at the rate of 21.8 to 57%, and within 12 minutes, 27 to 83.4%. The minimum latent period was 22 to 28 minutes. The average

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ACCESSION NR: AP5012391

yield per infected bacterial cell was 51 to 148 bacteriophage particles.
The inactivating dose of bacteriophage after x-irradiation ranged from
0.16 to 0.37. Orig. art. has 3 tables.

ASSOCIATION: Sredneazypatskiy nauchno-issledovatel'skiy protivochumnyy institut,
Alma-Ata (Central Asian Scientific Research Antiplague Institute)

SUBMITTED: 14Jun63

ENCL: 00

SUB CODE: LS

REF SOV: 004

OTHER: 000

JPRS

Card

2/2

L 42911-65 ENT(1)/EWA(1)/EWA(6)-2 JK

ACCESSION NR: AP5008017

S/0016/65/000/003/0097/0101

AUTHOR: Shashayev, M. A.; Shapiro, I. L.; Shatalova, A. L.

TITLE: Length of periods during which plague and pseudotuberculosis bacteriophages are detected in a Rhombomys opimus organism

SOURCE: Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 3, 1965, 97-101

TOPIC TAGS: Rhombomys, bacteriophage, phage, plague, spleen, blood, pseudotuberculosis

ABSTRACT: The present study investigated the number of phage particles found in the spleen and blood of a Rhombomys after administering only plague or pseudotuberculosis phages and after administering each of the phages together with its corresponding bacteria. Possible ways of transmitting phages were also studied. Four groups of 55 animals each were administered the following: the first group received a Pokrovskiy plague phage in a dose of $5 \cdot 10^8$ particles; the second group received the same phage and dose, and also at the same time $1 \cdot 10^6$ cells of plague bacteria (strain No. 319); the

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ACCESSION NR: AP5008017

third group received a Kotlyarovskaya pseudotuberculosis phage in a dose of $5 \cdot 10^7$ particles; and the fourth group received the same phage and dose, and at the same time $1 \cdot 10^6$ cells of pseudotuberculosis bacteria (strain No. 26S). Each phage was introduced into the right groin area of the Rhombomys and the corresponding bacterial strain was introduced into the left groin area. Two or three animals from each group were killed daily for a period of 20 days to determine the number of plague and pseudotuberculosis phages in the spleen. Phages were found in the spleens of all animals in the four groups during the entire observation period (20 days). With simultaneous administration of a homologous bacteria strain to groups two and four, plague and pseudotuberculosis phages did not multiply. In another experiment, plague phages were found to circulate in the blood of a Rhombomys for a 72 hr period and pseudotuberculosis phages for a 24-48 hr period, with phage titers highest during the first 24 hrs. A plague phage was experimentally transmitted from a Meriones Rhombomys to a Rhombomys opimus by Xenopsylla gerbilli minax fleas, but this rarely occurs in nature. Lysogenic bacteria appear to be the main source of plague and pseudotuberculosis phages for rodents. Study data showing that phages do not multiply in the presence of homologous bacterial

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L 42941-65

ACCESSION NR: AP5008017

strains explains why various attempts to use phages as therapeutic agents in infectious diseases have failed. Orig. art. has: 2 tables and 1 figure.

ASSOCIATION: Sredne-Aziatskiy nauchno-issledovatel'skiy protivochumnyy institut i Taldy-Kurganskaya protivochumnaya stantsiya (Central Asia Scientific-Research Antiplague Institute and Taldy-Kurgansk Antiplague Station)

SUBMITTED: 14Jun63

ENCL: 00

SUB CODE: LS

NR REF SOV: 002

OTHER: 000

Card 3/3 *pm*

AUTHOR: Shashek, A.V., Engineer. sov/ 100-11-6-9

TITLE: Underground Quarrying of Large Limestone Blocks Using
a Gantry Crane (Podzemnaya dobycha krapnykh blokov
s primeneniem kozlovogo krana).

PERIODICAL: Mekhanizatsiya Stroitel'stva, 1957, Nr 11, P 25.

ABSTRACT: In the Sevastopol' region underground quarrying of large limestone walling blocks takes place by means of a stone sawing machine (system Galanin). The blocks are transported by means of mobile cranes with a reach of 10m. The support of the crane is in the shape of a frame consisting of two tubular legs connected at the top and bottom by means of steel joists. The legs have two wheels of 180mm diameter. The crane is driven on rails by an electro-motor. The speed of the crane is 2.3m per minute and the weight 4,640 Kg. The process of quarrying blocks is described in detail. The illustration is a diagram of the crane and the relative position of the stone saws. There is one illustration.

1. Rock--Production
2. Rock--Handling
3. Hoists--Performance
4. Hoists--Design

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14(5)

SOV/127-59-3-4/22

AUTHOR: Shashenkov, A.P., Director of the Plant (Nal'chik)

TITLE: On the Production of Automation Equipment for the Mining Industry (O proizvodstve priborov avtomatiki dlya gornorudnoy promyshlennosti)

PERIODICAL: Gornyy zhurnal, 1959, Nr 3, pp 17-19 (USSR)

ABSTRACT: The Tsvetmetpribor Plant in Nal'chik is producing special equipment for automatic control, communications and signalization purposes. The plant organized the production of two variations of a complete unit ARV, for the automation of water pumping in mines; ARV-61 for high voltage and ARV-60 for low voltage motors. The ARV-61 automatically executes by remote control all operations connected with water pumping. Production of AIN-62 equipment for pumps is also organized. This unit is designed for the automation of movable or fixed water pumping installations with asynchronous short-circuited motors up to 50 kw voltage. The author

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SOV/127-59-3-4/22

On the Production of Automation Equipment for the Mining Industry.

complains that large productive possibilities of the plant are often ignored by the RSFSR Gosplan, and the same ARV equipment has been ordered from other plants thus creating a needless duplication of production. The plant is also producing equipment for the centralized control of signals and switches for underground electric locomotives. The plant could produce an even larger quantity of signalling equipment, but not enough orders have been received for 1959. Due to the shortage of cables distributed by the Gosplan, many mines and plants cannot install this equipment. Production of equipment for the coordination of hoisting operations has been cut down because of the shortage of orders, though outdated equipment is still used in many mines. On the other side, the number of orders for other equipment is so large, that their fulfillment will take years. Funds furnished by the Gosplan for the enlargement of the plant are far from suffi-

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SOV/127-59-3-4/22

On the Production of Automation Equipment for the Mining Industry.

cient. Moreover, owing to the shortage of qualified specialists in plants and mines, the Tsvetmetpribor plant is obliged to send its own specialized workers to assemble the equipment.

ASSOCIATION: Zavod Tsvetmetpribor. (The Tsvetmetpribor Plant),
Nal'chik.

Card 3/3

S/762/61/000/000/016/029

AUTHORS: Borisova, Ye. A., Shashenkova, I. I.

TITLE: The heat treatment of the BT6 (VT6) alloy.

SOURCE: Titan v promyshlennosti; sbornik statey. Ed. by S. G. Glazunov. Moscow, 1961, 170-175.

TEXT: The BT6 (VT6) alloy is a formable two-phase ($\alpha + \beta$) alloy of the Ti-Al-V system with 5-6.5% Al and 3.5-4.5% V. The relatively small content of β phase renders it amenable to heat treatment, which may increase its tensile strength by 15-25% in comparison with its initial state after anneal. The precise quench and aging schedule depends on the operational requirements of the part. In sheet material, for example, the pre-quench T is limited to 850°C by the appreciable oxidation occurring at high T. The tensile strength attainable is tabulated versus quench T and aging T. The quench T affects the yield limit of the alloy significantly and expands the $\sigma_b - \sigma_{0.2}$ difference from the usual value of Ti alloys (5-7 kg/mm²) to 15-20 kg/mm². This effect, which favors the formability of sheet material, is reduced to its normal value by aging. Inasmuch as the depth penetration of the quench-hardening is limited, rods with a diameter greater than 25-30 mm do not undergo hardening penetration to the core. Hence, parts intended for hardening should be first roughed down by machine tool, then quench-hardened, and lastly finished by removal of the gas-contaminated surface layer. The final results of the heat treatment are also affected by the type of structure of the initial material and by its content of gaseous

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The heat treatment of the BT6 (VT6) alloy.

S/762/61/000/000/016/029

admixture and, more especially, O. Depending on the T history of the hot forging and the degree of final deformation, the microstructure of the semifinished piece may exhibit either an equiaxial ($\alpha + \beta$) structure or an acicular structure with sharply defined initial- β -phase grain boundaries. The second type has lower plasticity-characteristic values, especially necking (full-page tabular comparison). The differences become most pronounced upon heat treatment consisting of quench and aging. Specimens forged in the ($\alpha + \beta$) region, at 950-800°C, have better plasticity than those forged in the β region, at 1,200-1,050°C. An increasing O content (tested up to 0.25%) improves the tensile strength and yield limit and reduces the plasticity, especially the necking and the notch toughness. The increase in strength extends to high T and applies both to short-duration and to stress-rupture tests. O is most effective on the post-heat-treatment properties of the alloy. An optimal compromise between strength and plasticity is achieved with no more than 0.2% O. The VT6 alloy excels by its elevated thermal stability, which is not impaired by the heat treatment. However, operation in excess of 100 hrs must be held to T's lower than the aging T. There are 6 figures and 3 tables; no references.

ASSOCIATION: None given.

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L 16646-65 EWT(m)/EWP(w)/ENA(d)/ENP(v)/EWP(t)/ENP(k)/ENP(b) Pf-4
IJP(c)/ASD(m)-3/AFETR MJW/JD/HM

ACCESSION NR: AP5000164

S/0032/64/030/012/1504/1505

AUTHORS: Borisova, Ye. A.; Shashenkova, I. I.

TITLE: A method of determining the tendency toward crack formation under prolonged loading for sheet titanium alloys

SOURCE: Zavodskaya laboratoriya, v. 30, no. 12, 1964, 1504-1505

TOPIC TAGS: titanium alloy, weld, arc welding, metal binding, crack formation / Gagarin press, VT 14 alloy

ABSTRACT: A method for determining the tendency toward crack formation in a welded structure of titanium alloys exposed to prolonged loading is described. The method is based on prolonged deflection from the planar stressed state and on determination of the time lapsed before crack appearance. Loads were applied by means of a screw-clamp device as shown in a photograph. Specimens were prepared from two plates of 64 mm diameter, up to 2.5 mm in thickness, and butt-welded by argon arc welding. Deflections were measured with a micrometer depthmeter accurate to 0.01 mm. The tests proceeded as follows: specimens were loaded by means of a standard Gagarin press, starting with a zero load which increased until failure load was reached; measurements of deflection were made as the load

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ACCESSION NR: AP5000164

increased, and the resulting load-deflection curve was plotted (See Fig. 1 on the Enclosure). Then similar specimens were loaded so as to produce a sag deflection which was increased in 0.25-mm increments. After each sag increment the specimen was examined for crack formation with a binocular microscope. If no cracks were detected, the sag was increased 0.25 mm and the specimen was reexamined. When cracks were detected, the corresponding load producing the given sag was determined from the plot (Fig. 1). The method described was tested on specimens made from alloy VT-14 under various temperature conditions. S. M. Smirnova (technician) participated in the tests. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 00

SUB CODE: MM

NO REF SOV: 000

ENCL: 01

OTHER: 000

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